SEABOARD GROUP II AND CITY OF HIGH POINT
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May 13, 2013

Mr. Qu Qi, P.G.
North Carolina Department of Environment and Natural Resources
Division of Waste Management
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Re: Quarterly Remedial Action Construction Progress Report, 1st Quarter 2013, Seaboard Chemical Corp. and Riverdale Drive Landfill Site, Jamestown, North Carolina

Dear Mr. Qu Qi:

Seaboard Group II and the City of High Point (herein the Parties) provide this Remedial Action Construction Progress Report for the former Seaboard Chemical Corporation facility (SCC) and closed Riverdale Drive Landfill (Landfill), collectively the "Site". The Remedial Action Pre-Construction Report for the mechanical treatment systems was submitted to North Carolina Department of Environment and Natural Resources (NCDENR)[1] on December 28, 2009. The report was subsequently approved by NCDENR Division of Waste Management on March 22, 2010. Although the Natural Treatment Systems Remedial Action Pre-Construction Report has not been formally approved by NCDENR, it was submitted on October 25, 2010, and the Parties have included comments on those activities in this report.

Summary of Remedial Construction Work Performed since the Last Progress Report

The activities conducted since the last progress report mainly involve field construction activities and the installation of the physical and phytoremediation treatment system components. Technical Memoranda numbers E-4, E-5, E-6 and E-7 have been submitted and approved by NCDENR since the last report. Those documents explain in some detain the difficulties that have been experienced in the construction and startup of this system.

At this time, the remedial treatment systems at the Site have been installed, and the Parties are in the process of modifying certain components. The automation and irrigation upgrades, as well as most other items that were known to be required for initial startup and testing, were complete during the first quarter of 2013. With certain exceptions that are described in this report, the construction has progressed steadily considering the overall complexity of the remedial systems and the unique nature of the remedy. The most significant delays have been due to the failure of the physical treatment system original equipment manufacturer to manufacture, test and deliver a system that was complete and ready to be placed in service upon delivery, as required by the bid specifications and contract with the Parties.

[1] NCDENR is used in this report to refer to the North Carolina Department of Environment and Natural Resources, and collectively the associated Division of Waste Management, Division of Solid Waste and the Inactive Hazardous Sites Branch, all of which are involved in the regulatory oversight of this remedial action project.

In addition, recently it has been determined that the level of metals such as iron and manganese in the leachate and groundwater are significantly higher than those detected in earlier testing. At first, this was thought to be a temporary spike in metal concentrations due to initial system operations. However, it has been determined to be an indication of an apparent chronically high level of metals, particularly in the leachate. At this time, the Parties are modifying the mechanical system to address the need to remove additional metals. A more detailed explanation of the metals levels and manner in which they are being addressed is included later in this report. Once those modifications are complete, the system will resume startup testing. At this time, the Parties are using their best efforts, and believe that they will be ready for full operation by December 31, 2013.

Automation **Equipment Defects**

The physical treatment system was not functional at the time of delivery by the manufacturer, Purifics ES, Inc. (Purifics).[2] The system contained numerous mechanical and electrical defects, and proved unable to perform safely and reliably during operation as required under their contract with the Parties. The most significant defects were related to the system control and data acquisition hardware and software, provided by Purifics, that controls the overall operation, alarm and interlock functions of the physical and phytoremediation treatment systems. This equipment, hardware, associated software programming and licenses are collectively referred to in this report as the "supervisory control and data acquisition system" or "SCADA". Although the SCADA proved to contain the most difficult and time-consuming defects to correct, the remaining components of the supplied equipment also contained numerous other mechanical and electrical defects, bid specification discrepancies and regulatory nonconformities.

As the defects were encountered, the manufacturer was notified of the nature and extent of each and the Parties made repeated requests to have them corrected. Unfortunately, Purifics was either unwilling or unable to correct most of the defects after repeated requests, demands and notices by the Project Managers and the Parties attorneys (Counsel). After thorough review by an automation engineering contractor independently retained by the Parties, it was determined the SCADA hardware and software provided by the manufacturer were defective and could not be effectively and economically modified or upgraded such that they would perform in a safe and reliable manner when used as intended. Therefore, the Parties determined the SCADA needed be replaced in its entirety in order for the system to be made usable and to perform safely and reliably during operation.

Automation Upgrade

The Automation Upgrade Project addressed many of the manufacturer's defects. During this project, the SCADA and other automation hardware and software supplied with the equipment were replaced with an entirely new system using new hardware and programed with software developed specifically for the process in a more robust and reliable computer language. The automation upgrade progressed as scheduled and was complete in February 2013.

Irrigation Equipment Defects

In addition to the problems addressed in the Automation Upgrade Project, the irrigation system had experienced failures in over 50% of the soil moisture probes specified in the original

[2] Purifics refers to Purifics ES, Inc. of London, Ontario, Canada.

irrigation network design submitted to NCDENR in the *"Phytoremediation Preconstruction Report"* (URS Corporation, October 2010) that were installed in the Landfill cap soils. Those probes failed to provide sustained and reliable data transmission to the SCADA, which is necessary to manage the irrigation process. In addition, the irrigation network communication hardware provided by the manufacturer of the mechanical system equipment used to translate the soil moisture probe data and input it into the SCADA had proven to be defective, unreliable and unable to be used as required. It was unable to maintain continuous communication with the SCADA mainly due to conflicts with other components in the system and serious latency and timing issues, all of which caused unexpected system conflicts during initial testing.

Irrigation Upgrade

The irrigation system defects were addressed in the Irrigation Upgrade Project. During this project the soil moisture probe failure was addressed and corrected by replacing the 69-soil moisture probes with new soil suction probes. These probes are more substantial and less likely to be damaged by the conditions of use at the Site. In addition, the remaining defects were also corrected during this project by replacing the faulty translation components and programming with entirely new hardware and software that communicated properly with the SCADA. This included the installation of two data loggers, one on each landfill lobe, to record the moisture and soil temperature readings and transfer them into the SCADA. This project was also completed during the first quarter of 2013.

Metals Concentration Problems

In past testing the concentrations of iron and other metals detected in the combined groundwater and leachate had been reported to be low. During the pilot testing of the advanced oxidation system (AOP), and other testing performed earlier, the concentration of iron, in particular, was indicated to be in the range of 10 to 20 mg/l. Recently that was determined to be no longer the case. Recent testing has determined that, particularly in the leachate, the iron level is much higher, in the range of 100 to 120 mg/l. It was therefore concluded it would be necessary to address the iron and other metals in that process flow to avoid fouling of pipes and equipment. In addition, it was determined that it would be necessary to remove most of the iron and other metals from the groundwater flow as it enters the system, rather than in the main treatment structure. This is in order to avoid fouling the pipes inside Lift Station 2 (LS-2) and the main treatment structure, and to avoid unmanageable amounts of iron sludge from being generated in the Metals Removal Vat.

In determining the most effective resolution to this problem, the Project Managers referred to work performed much earlier in the remedial action by ERM-NC, PC. In a report authored by Dr. Richard Brown of ERM, several methods of iron control were explored including sequestration, chelation, ion exchange and aeration. The only method that seemed operationally and economically viable was aeration. As a result, a pilot study was performed to simulate a proposed process design. This modification would consist of aeration at LS-1 followed by filtration and air stripping prior to the combined flows entering LS-2 for treatment. This is intended to address the iron and other metals from the combined flow of groundwater and leachate before it enters LS-2.

This required the system design be modified to add aeration at LS-1 and the installation of a new building to house a larger filter and an air stripper system to process the combined flow of all groundwater and leachate prior to entering the main treatment system. A new building is

required because it was determined the floors installed in the existing structures were not capable of supporting the weight of the properly sized filter bodies once they were full of water.

Metals Removal Upgrade

The metals removal upgrade consists of adding an aeration tank to the flow path at LS-1. The aeration tank will employ ceramic fine bubble diffusers to aerate the combined leachate and groundwater flow exiting the inlet manifolds in LS-1. That flow will be directed to a newly installed vertical flat-bottomed tank with the fine bubble diffusers. That tank will gravity overflow into the existing tank T-120 where the existing P-120 A&B pumps will transfer it to the new filter building.

Filtration Equipment Problems

It was determined the "Media Filters" provided by the manufacturer would not adequately handle the flow anticipated. It was also determined there were significant problems with the media filter design. During backwash, the filter media was being washed out of the filters and into the Metals Removal Vat. Further investigation revealed the filter bodies were inadequately sized for the design flow. This made the velocity of the backwash water too high and, rather than just lifting the bed, it was carrying the media out of the vessels and into the Metals Removal Vat.

Filtration Upgrade

Further investigation determined the main treatment structure floors were unable to support filter bodies of the size needed for proper filtration. With properly sized filter bodies, the vessels were estimated to be 4 feet in diameter and 6 feet tall. That meant the vessels would hold roughly 70 cubic feet. Of that, 30 cubic feet are the media of which about ½ are solids. The water content is about 55 cubic feet. At 62.43 pounds per cubic foot, the force exerted on the floor due to the water alone would have been roughly 3,350 lbs. Add to that, 30 cubic feet of media and the weight of the vessels themselves and the total weight of a single vessel would be approximately 7,000 pounds. Because filter bodies of that size are dished end vessels, they are mounted on 4-legs. At the loading calculated, each leg would have needed to support 1,750 pounds. Because the floors are made of ¾ inch plywood supported by a limited number of steel crossbeams, it was determined they were not structurally sufficient to support the weight of the larger filter bodies.

That lead to the decision the filters and associated equipment needed to be installed in a new 30 by 30 foot metal structure constructed on a concrete pad designed to support the filter bodies, and to provide aeration and filtration of the entire flow of groundwater and leachate prior to its entry into LS-2. This includes the flow from PWDR-1 (the primary groundwater pumping well) and certain other groundwater wells that do not pass through LS-1.

The design calls for the combined aerated flow from LS-1 to be directed to a tank in the "filter building" where it will be mixed with the other influent flow and filtered prior to being air stripped. To accomplish this the existing oxidizer storage tank will be used as an inlet storage tank. The total flow entering the system will be pumped through the new filter system and into the Air Stripper. From there the system flow will be sent to the Metals Removal Vat before it is either sent directly into T-400 tanks for discharge, or on to the AOP for additional processing before discharge. The remainder of the process will remain unchanged.

Remedial Construction Work Remaining

The following activities remain to complete the construction and implementation of the remedy:

Physical Treatment System

Lift Station-1
Complete except for the installation of the aeration tank that is in progress.

Lift Station-2
Complete except for the modifications for the filter building that are in progress.
Main Treatment Structure
Complete except for the modifications for the filter building that are in progress.

Filter Building
Building permits applied for and pending, prepared to install the grounding mat and pad as soon as permits are issued.

Summary

The remedial system construction and startup have fallen behind schedule based upon the original Scope of Work included in *Remedial Action Settlement Agreement* (RASA). However, the items preventing the startup were related to the failure of the equipment manufacturer to comply with the contractual, regulatory and professional requirements in the contract documents. On five occasions, Technical Memoranda (TM) have been submitted to NCDENR to extend the construction schedule, as required by the RASA. These include TM-E2, TM-E4, TM-E5, TM-E6, and TM-E7; and each, with the possible exception of TM-E7, was solely the result of the manufacturer's failure to meet its commitments. Even with the iron problem detected recently, had the equipment provided by the manufacturer been complete and ready to operate when delivered, the system could have been started up and operated on schedule.

In January 2012, Counsel notified Purifics of certain defects and serious material breaches in the terms of its contract with the Parties. When Purifics failed to correct the defects, Counsel re-notified them in June 2012 of the continuing defects and serious material breaches. Because the manufacturer refused to return to the Site and complete the work required, the Parties instructed the Project Managers to have the tasks necessary to correct all defects evaluated, corrective measures scoped, and all of the defects corrected as soon as possible. They also instructed them to undertake any other tasks necessary to complete the remedial system and place it into service as soon as possible.

Significant progress has been made since that time, and the items originally thought necessary to be completed before startup were finished by March 31, 2013. Initial startup began on April 1, 2013 when the irrigation network data was incorporated into the automation system and the automation upgrade was totally complete. There was a delay in incorporating the irrigation data into the SCADA due to a delay in delivery of one of the components. Once that equipment was delivered and installed, and the final data inputs were added to the SCADA, the system was tested by the automation contractor and the upgrade was complete.

The remedial activities are now on schedule to be completed by the date approved by NCDENR in TM E-7. Everything known to be necessary to begin the startup and testing of the system is

either in the process of being installed, or has been completed, tested and is ready to be placed in service. The system startup testing will resume as soon as the filter building modifications are complete. This is estimated to be complete by June 30, 2013.

This system requires a phased startup in which each phase is followed by a series of tests which, when successfully completed, allows the system to progress to the next phase. The final phase is complete when the system is in full operation processing 50 gallons per minute (GPM) of combined leachate and groundwater to the required treatment effluent limits. The testing is scheduled to be complete and the system ready for full operation on or about December 31, 2013.

Please contact Mr. Gary D. Babb (919-325-0696) or James C. LaRue (281-431-3571) if there are any questions or comments. Please direct correspondence related to this matter to:

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Respectfully,

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